AMAZONIANA	VIII	2	255 – 264	Kiel, Dezember 1983

New Freshwater Sponges From Amazonian Waters

by

Cecilia Volkmer Ribeiro and S. Becker Maciel

Museu de Ciências Naturais da Fundação Zoobotânica do Rio Grande do Sul,
Porto Alegre, RS, Brasil

Abstract

The study of new collections of Amazonian freshwater sponges demonstrated that *Trochospongilla pennsylvanica* (POTTS 1882) is a cosmopolitan species, that *Trochospongilla variabilis* BONETTO & EZCURRA DE DRAGO (1973) occurs as far north in the neotropical region as the Amazon basin and that *Spongilla spoliata* n. sp. and *Radiospongilla amazonensis* n. sp. share a good number of morphological similarities with two oriental species.

Keywords: **amazonian freshwater sponges, similarities, oriental species.**

Previous works by VOLKMER-RIBEIRO (1981 and respective bibliography) dedicated to the study of the Amazonian freshwater sponge fauna have demonstrated that this fauna is specifically rich and particulary abundant in the Amazonian ecosystem.

In the present paper four new occurrences are registered for Amazonian waters. Three of them are new occurrences also for the Neotropical region. A new species is described in the genus *Spongilla* LAMARCK (1816), and another in the genus *Radiospongilla* PENNEY & RACEK (1968).

The numbering of the specimens corresponds to the entries in the Porifera Catalog of Museu de Ciências Naturais da Fundação Zoobotânica do Rio Grande do Sul (MCN). In the present paper a correction is introduced respecting the geographical situation of Cuieiras river. This river is in the Amazonas State and not in the Para State as refered to by VOLKMER-RIBEIRO (1979).

0065-6755 / 1983 / 255 / © MPI für Limnologie, AG Tropenökologie, Plön; INPA, Manaus

Genus *Spongilla* LAMARCK (1816)
"sensu" PENNEY & RACEK (1968)

Spongilla spoliata n. sp.
Figs. 1 and 2

Material: Several pieces of the sponge in alcohol. Cuieiras River, Amazonas State, Brazil, 1961, E. J. FITTKAU leg. Collected from 15 m deep.

Holotype: The largest pieces, with gemmules. Taken out of the alcohol and dried. Deposited at Museu Nacional da Quinta da Boa Vista, Rio de Janeiro.

Fragments of the holotype, also with gemmules and dried were deposited in Museu de Ciências Naturais da Fundação Zoobotânica do Rio Grande do Sul under number 37.

Type locality: Cuieiras River, Amazonas State, Brazil.

Description: Sponge encrusting, forming nodulose growths or displaying a tendency to progress in growth towards short, waving branches on leaves or twigs of the submersed vegetation.

Skeleton consisting of a basal, irregular, open arrangement of spicules from which arise slender vertical spicule fibers. These fibers project beyond the general level of the sponge so as to produce a hispid surface. Pinacoderm inconspicuous. Consistency of dry sponge very fragile, color brownish yellow, oscules inconspicuous.

Megascleres: quite long, slender to robust, completely smooth, slightly curved anfioxea with abruptly, almost lanceolated extremities. Lenght range 406 - 626 micrometers; width range 14 - 30 micrometers.

Microscleres: rare, minute, slightly crescentic in outline, completely microspined, with the extremities gradually very sharp pointed and bearing in their central region a few to several large, irregularly shapped spines.

Gemmoscleres: absent.

Gemmules: abundant, singly held in capsules built up of the smaller megascleres and situated close to surface of the sponge, with a maximum diameter of 623 micrometers; ovoid, pneumatic layer poorly developped, smaller megascleres sometimes embedded in this layer; foramen bearing a short, conical collar.

Remarks: only two species were described in the genus *Spongilla* "sensu" PENNEY & RACEK (1968), which lack gemmoscleres and are contained inside cages built up of the megascleres, i. e. *S. aspinosa* POTTS (1880) and *S. inarmata* ANNANDALE (1918). The first one is known only from the United States and the second is aparently restricted to Japan, PENNEY & RACEK (1968). The new species has megascleres which largely surpass the measures of the megascleres in the other two species, whilst microscleres show about similar dimensions in the three species. However, whilst in *S. aspinosa* the microscleres are competely smooth, in *S. inarmata* they have minute spines in their central portion and in *S. spoliata* the spines are conspicuously larger so as to render distinction between these two last species easy, as can be seen from fig. 2.

Genus *Radiospongilla* PENNEY & RACEK (1968)
Radiospongilla amazonensis n. sp.
Figs. 3, 4 and 5

Material: One large piece of the sponge, several small fragments and a large amount of free gemmules, dried. "Posto do Jacaré", Culuene River (Xingú basin), Mato Grosso State, Brazil, J. C. DE MELLO CARVALHO leg., 1947.

Holotype: The largest piece of the sponge. Dried. Deposited at Museu Nacional da Quinta da Boa Vista, Rio de Janeiro.

Fragments of the holotype, a good amount of gemmules as well as several slides of spicular preparation were deposited in Museu de Ciências Naturais da Fundação Zoobotânica do Rio Grande do Sul under number 115.

Type locality: Culuene River, (Xingú basin) Mato Grosso State, Brazil.

Description: Sponge massive, slightly branching, about 2 cm thick, 3.5 cm high and 5 cm long; surface even but a little hispid; oscula conspicuous at one of the faces of the sponge; pinacoderm well developped; skeleton consisting of irregular, very slender spicule fibers joined together by scanty spongin and forming an open network; consistency of dry sponge extremely fragile, color dirty yellow.

Megascleres straight, cylindrical, stout anfistrongyla, sometimes displaying a bulbous terminal swelling; covered with conspicuous, acute spines; towards the extremities of the scleres these spines are incurved and more densely arranged so as to confere to these terminations the aspect of an artichocke. Lenght range 240 - 344 micrometers; width range 12 - 25 micrometers. Young megascleres are anfioxea with usually lanceolated tips.

Microscleres: absent.

Gemmoscleres stout, strongly spined anfistrongyla with usually straight shafts; spines larger and arranged in several rows at the tips of the scleres; tips umbonate and middle part of the shafts sometimes smooth. As in other species of the genus, free gemmoscleres are commonly seen in the pinacoderm or mingled in the skeleton fibers. Lenght range 75 - 94 micrometers; width of shaft 3 - 8 micrometers.

Gemmules: extremely abundant and scattered among the skeletal meshes from the base to the summit of the sponge; spherical, with a diameter ranging from 276 to 401 micrometers; gemmoscleres radially embedded in the pneumatic coat, with one extremity in contact with the inner gemmular wall and the other reaching, but not piercing the outer gemmular membrane. Porus tube conical, sometimes long, other times short.

Remarks: The new species closely resembles *R. indica* (ANANNDALE 1907) (from India, Indonesia and Philipines) in the possession of anfistrongylous megascleres where a bulbous aggregation of terminal spines is sometimes conspicuous. However, the robustness of the spicular components of *R. amazonensis* and the shape of its megascleres, allied to the particular geographical distribution of the species, presently recommend the description of a new species for the Brazilian material.

Genus *Trochospongilla* VEJDOVSKY (1883)
"sensu" PENNEY & RACEK (1968)
Trochospongilla pennsylvanica (POTTS 1882)
Fig. 6

Tubella pennsylvanica POTTS, 1882

Trochospongilla pennsylvanica PENNEY & RACEK, 1968, p. 137 (and synonym)

Tubella mello-leitaoi (sic) MACHADO, 1947 (partim, only plate VI, fig. 1) (new synonym)

Material: MCN n^{O}s 261 and 262, mouth of Cuieiras River, Amazonas State, Brazil, 18.XII. 1961, E. J. FITTKAU leg.; MCN n^{O} 852, Sete de Setembro River (Xingú basin), Pará State, Brazil, VIII, 1965, E. J. FITTKAU leg.; MNRJ holotype of *Tubella mello-leitaoi* Tapirapés River (Araguaia basin). O. X. DE BRITO MACHADO leg, IX. 1945. (MNRJ: Museu Nacional da Quinta da Boa Vista, Rio de Janeiro).

Sponge minute, forming small, level, whitish, yellowish or brownish crusts on the surface or inside larger sponges of the genus *Metania* GRAY (1867) or of the genus *Drulia* GRAY (1867). The crusts are in fact a basal layer of gemmules barely covered by randomly packed megascleres. In some of these crusts a few spicular fibers may be formed which pierce the surface of the sponge producing the hispid surface typical of the genus. Dry sponge extremely fragile, the gemmules falling free as one works to separete them from the skeleton of the supporting sponge.

The shape of the megascleres differs little from material of *T. pennsylvanica* from the United States and Canada though the size is conspicuously reduced: lenght range 54 to 150 micrometers, width range 3 to 10 micrometers.

The gemmoscleres perfectly conform what has been described for gemmoscleres of this species; maximum lenght of shaft: 27 micrometers and maximum diameter of the inner rotule: 21 micrometers.

The gemmules are abundant, spherical, free and provided with a short and wide porus tube bearing a layer of slanting gemmoscleres. The smaller gemmules range in diameter from 250 to 276 micrometers and the largest from 300 to 500 micrometers. Smaller gemmules with a thick inner gemmular wall and a

thin pneumatic coat. Gemmoscleres embedded in the inner wall in one to three layers, the lower rotules slightly overlapping each other and the upper rotules rarely reaching the pneumatic coat. The larger gemmules show a very thick pneumatic coat where a few to many megascleres can be seen randomly embedded so as to produce an external outer envelope. Pneumatic coat with polygonal cells.

Remarks: The comparison of the present material with spicular slides of *T. pennsylvanica* from Canada and the United States (Washington, West Virginia and Pennsylvania) demonstrated no other differences than smaller sizes and more pronounced covering of spines of the megascleres in the Amazonian material. It is the opinion of the authors that such characteristics should be considered as ecomorphic variations linked to the microhabitat where the sponges were living, i. e. inside other larger sponges. Study of the holotype of *Tubella mello-leitaoi* MACHADO (1947) (which was included by VOLKMER-RIBEIRO (1976) in the synonymy of *Metania reticulata* (BOWERBANK 1863)) also evinced the occurrence of small specimens of *T. pennsylvanica* inside the reticulum of the large sponge. In his plate VI, fig. 1 MACHADO (1947) illustrates one of the megascleres of *T. pennsylvanica* described by him as a spined megasclere of *T. mello-leitaoi.* In spite of the fact that PENNEY & RACEK (1968) considered the distribution of *T. pennsylvanica* as apparently restricted to the North American Continent, ANNANDALE (1911) had already recorded its occurrence from the west coast of India and from Scotland. The present register, which is the first for the southern hemisphere, indicates a cosmopolitan distribution for this species.

Trochospongilla variabilis **BONETTO & EZCURRA DE DRAGO (1973)**
Trochospongilla variabilis **BONETTO & EZCURRA DE DRAGO (1973), p. 15;**
VOLKMER-RIBEIRO et al. (1975), p. 37

Material: MCN n^{o} 1051, Branquinho River (Cuieiras basin), Amazonas State, Brazil, 1961, E. J. FITTKAU leg.

Remarks: The species also occurred as microespecimens inside one large *Metania reticulata*, in the same way as just described for *T. pennsylvanica*. The characteristics of the material perfectly conform what was originally described for the spicular components of this species.

Summary

Four species of freshwater sponges have their first register of occurrence for Amazonian waters upon specimens collected from Culuene and Sete de Setembro Rivers (Xingú basin), Tapirapés River (Araguaia basin) and Cuieiras River. *Trochospongilla pennsylvanica* (POTTS 1882) and *Trochospongilla variabilis* BONETTO & EZCURRA DE DRAGO (1973) occurred as minute specimens inside large sponges of the genus *Metania* GRAY (1867) or of the genus *Drulia* GRAY (1867). *T. pennsylvanica* has its first register of occurrence for the Neotropical region. *Spongilla spoliata* n. sp. resembles *Spongilla inarmata* ANNADALE (1918) and *Spongilla aspinosa* POTTS (1880) but is readily separated from these two species on account of the characteristic spines on its microscleres. *Radiospongilla amazonensis* n. sp. differs from its congeners by the particular characteristics of its megascleres and gemmoscleres.

Resumo

Com base em material coletado nos rios Culuene e Sete de Setembro (ambos da bacia do rio Xingú), rio Tapirapés (bacia do rio Araguaia) e rio Cuieiras, é feito o primeiro registro de ocorrência, para a amazônia brasileira, das seguintes espécies de esponjas de água doce: *Trochospongilla variabilis* BONETTO & EZCURRA DE DRAGO (1973), *Trochospongilla pennsylvanica* (POTTS 1882), *Spongilla spoliata* n. sp. e *Radiospongilla amazonensis* n. sp. O registro de *T. pennsylvanica* é, ainda, o primeiro para a região neotropical. As duas primeiras espécies ocorreram como microespécimes dentro de esponjas maiores do gênero *Metania* GRAY (1867) ou gênero *Drulia* GRAY (1867). *S. spoliata* mostra caracteristicas semelhantes a *S. inarmata* ANNADALE (1918) e a *S. aspinosa* POTTS (1880) mas é facilmente distinguivel destas pela espinhadura tipica de suas microscleras. *R. amazonensis* distingue-se das demais espécies do gênero pelas caracteristicas peculiares e robustez de suas megascleras e gemoscleras.

Acknowledgments

The senior author is indebt to Dr. J. C. DE MELO CARVALHO of Museu Nacional da Quinta da Boa Vista, Rio de Janeiro and to Dr. E. J. FITTKAU of the "Zoologische Staatssammlung" of Munich, for the material enthrusted for study. The authors acknowledge the assistance of Dr. K. RUETZLER, Smithsonian Institution, in obtaining loan of slides of *Spongilla inarmata* ANNANDALE (1918), of *Trochospongilla pennsylvanica* (POTTS 1882) and of *Radiospongilla indica* (ANNANDALE 1907). The authors also acknowledge the granting of fellowships n^{o}s 11116134/76 and 104563/80 from Conselho Nacional de Desenvolvimento Cientifico e Tecnológico (CNPq) to respectively the senior and the junior authors. The final art to the drawings was carried out by Miss R. ROSA of Fundação Zoobotânica do Rio Grande do Sul.

References

ANNANDALE, N. (1907): Notes on the freshwater fauna of India. Description of new freshwater sponges from Calcutta a record of two known species from the Hymalayas, and a list of the Indian forms.- J. & Proc. Asiatic. Soc. Bengal **3**: 15 - 26.

ANNANDALE, N. (1911): Freshwater sponges, hydroids and Polyzoa.- In: The fauna of British India, including Ceylon and Burma. 251 + VIII, 5 plates. Taylor and Francis, London.

ANNANDALE, N. (1918): Zoological results of a tour in the Far East. II. Freshwater sponges from Japan, China and the Malay Peninsula.- Mem. Asiatic Soc. Bengal **6**: 199 - 216.

BONETTO, A. A. & I. EZCURRA DE DRAGO (1973): Las esponjas del genero *Trochospongilla* VEJDOVSKY en aguas argentinas.- Physis **32** (84): 13 - 18.

MACHADO, O. X. B. (1947): Espongiários do Tapirapés.- Publ. 102, Anexo 5. Ministério da Agricultura. Conselho Nacional de Proteção aos Indios. Zool. 4 p.

PENNEY, J. T. & A. A. RACEK (1968): Comprehensive revision of a worldwide collection of freshwater sponges (Porifera : Spongillidae).- U. S. Nat. Mus. Bull. **272**: 1 - 184.

POTTS, E. (1880): On freshwater sponges.- Proc. Acad. Nat. Sci. Philadelphia **1881**: 356 - 357.

POTTS, E. (1882): Three more freshwater sponges.- Proc. Acad. Nat. Sci. Philadelphia **1883**: 12 - 14.

VOLKMER-RIBEIRO, C. (1976): Revisão do gênero *Metania* GRAY, 1867 (Porifera : Spongillidae), para a região Neotropical.- Tese (Livr. Doc.-Zoologia) Instituto de Biociências, PUCRGS Porto Alegre, 51 p., 2 mapas, 8 est. (Não publicada).

VOLKMER-RIBEIRO, C. (1979): Evolutionary study of genus *Metania* GRAY, 1867 (Porifera : Spongillidae). I. The new species.- Amazoniana **6** (4): 639 - 649.

VOLKMER-RIBEIRO, C. (1981): Porifera.-In: HURLBERT, S. H., RODRIGUEZ, G. & N. D. SANTOS (eds.): Aquatic Biota of Tropical South America, Part 2: Anarthropoda XI + 298 pp: 86 - 95, San Diego State University, San Diego, California.

VOLKMER-RIBEIRO, C., GROSSER, K. M., DE ROSA-BARBOSA, R. & S. M. PAULS (1975): Primeiro relato da ocorrência de Espongilideos (Porifera) na Bacia do Guaiba, Estado do Rio Grande do Sul.- Iheringia, Zool. **46**: 33 - 49.

Author's address:

Dr. Cecilia Volkmer-Ribeiro
Museu de Ciências Naturais da
Fundação Zoobotânica do Rio Grande do Sul
Caixa Postal 1188
90000 – Porto Alegre – RS
Brasil

Mrs. Silvia Becker Maciel
R. Cupertino Durão 1401/303
22441 – Rio de Janeiro – RJ
Brasil

Accepted for publication in August 1983

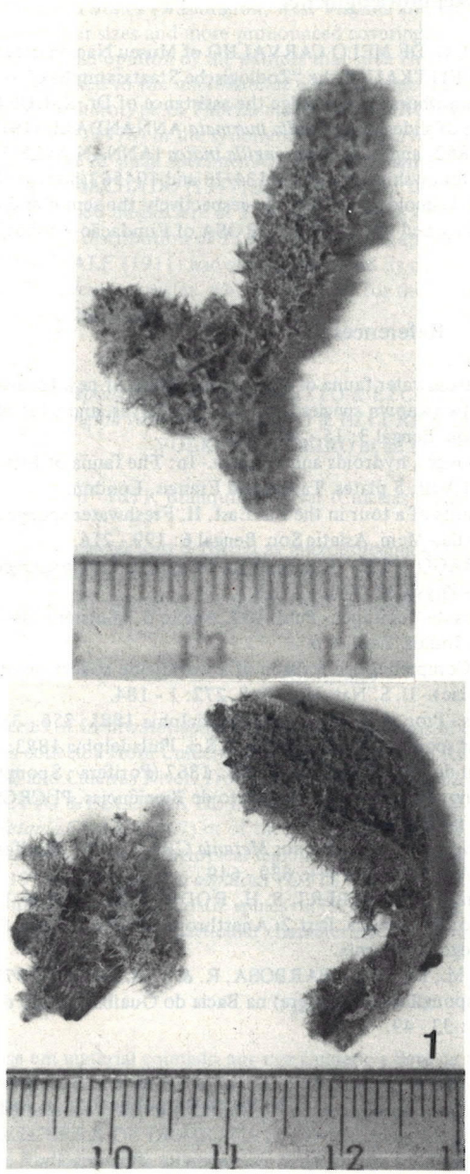

Fig. 1:
The three largest pieces of sponge which integrate the holotype of *Spongilla spoliata* n. sp. One piece can be seen to have grown around a twigg and another around a leaf of submersed vegetation.

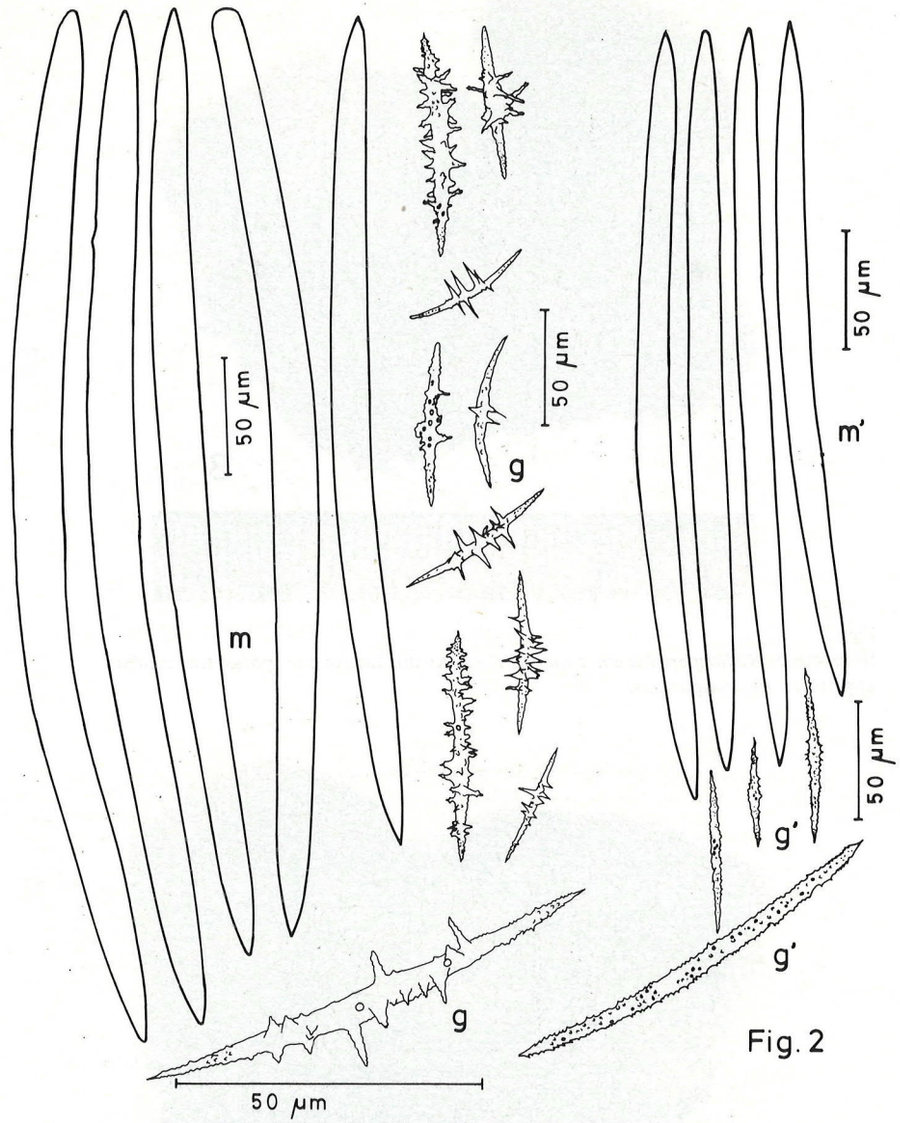

Fig. 2

Fig. 2:
"Camera lucida" drawings of the spicular components of *Spongilla spoliata* n. sp. and of *Spongilla inarmata* ANNANDALE (1918) (material from Japan, cotype, N. Gist Gee 56524). m = megascleres and g = gemmoscleres of *S. spoliata* n. sp.; m' = megascleres and g' = gemmoscleres of *S. inarmata*. At botton left a gemmosclere of the new species at high magnification and at bottom right a gemmosclere of *S. inarmata* also at high magnification.

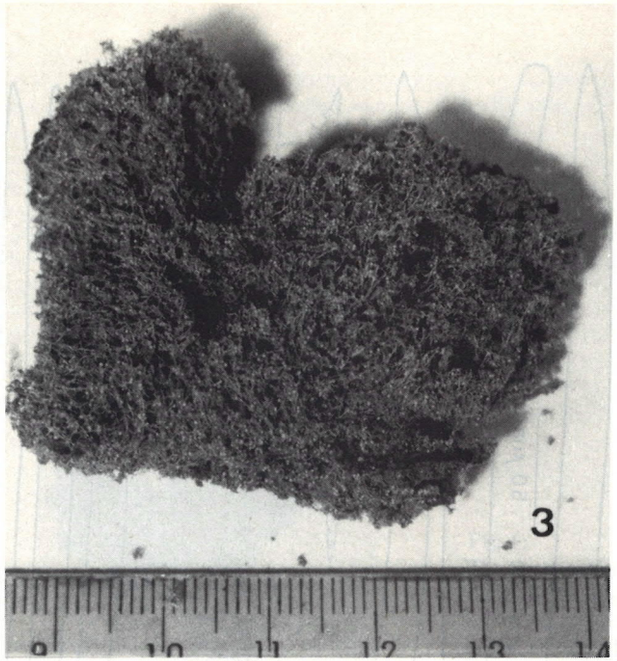

Fig. 3:
Holotype of *Radiospongilla amazonensis* n. sp. At this face of the sponge the oscular appertures are conspicuous.

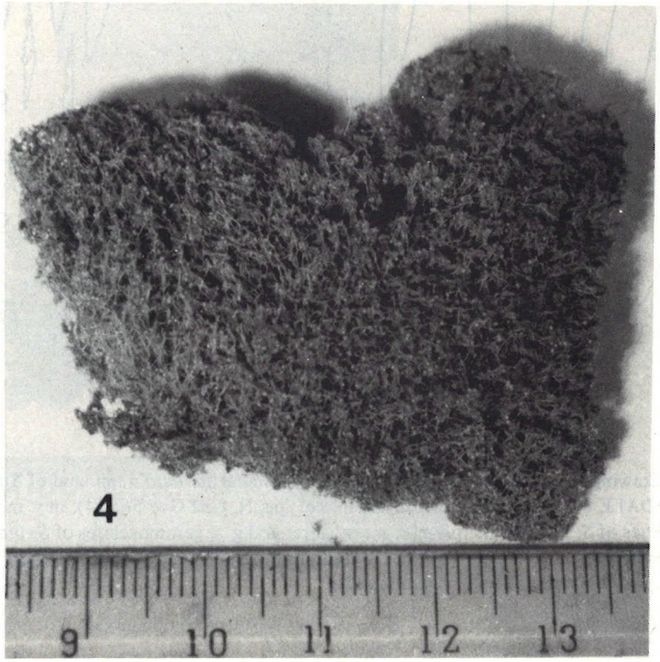

Fig. 4:
Holotype of *Radiospongilla amazonensis* n. sp. Face of the sponge opposite to the one seen in fig. 3. Whitish tiny gemmules can be seen in both figures, from the base to the summit of the sponge.

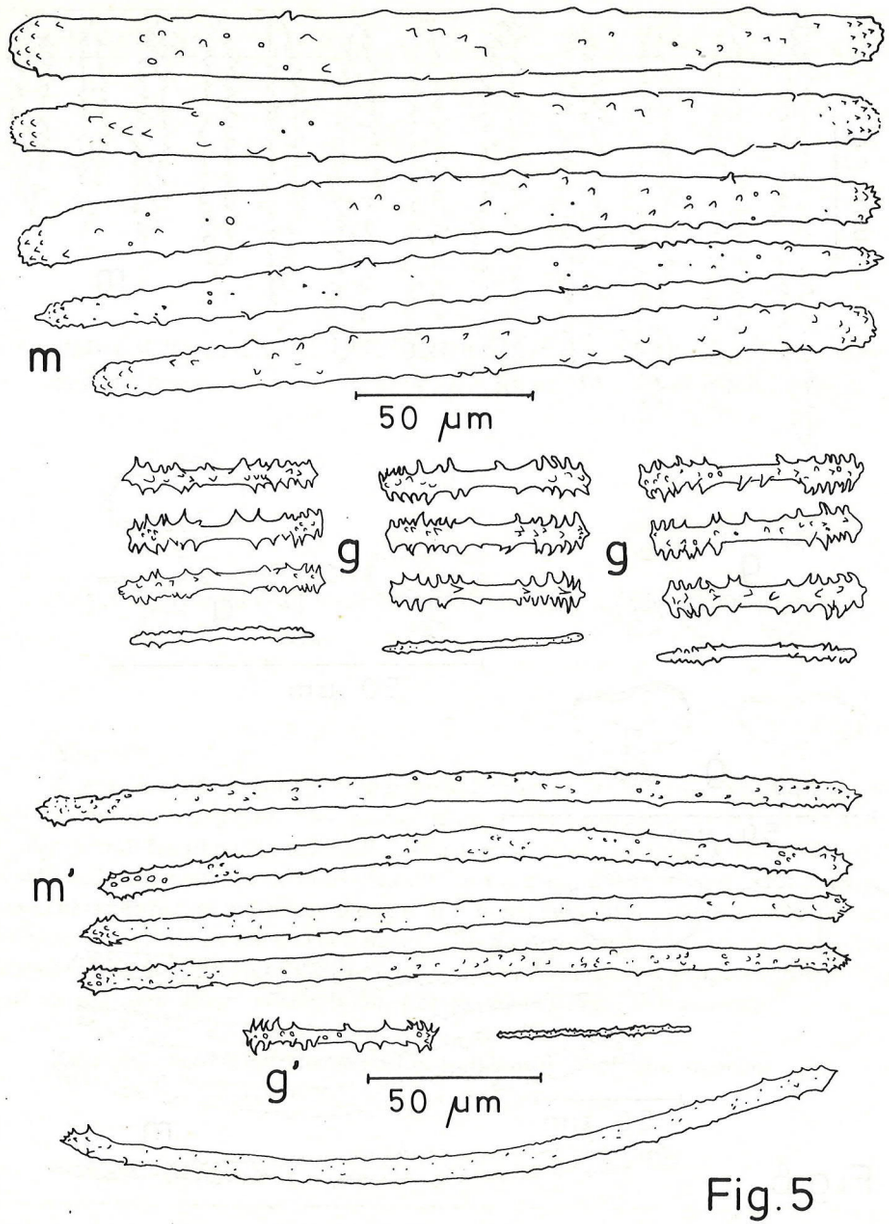

Fig. 5:
"Camera lucida" drawings of the spicular components of *Radiospongilla amazonensis* n. sp. and of *Radiospongilla indica* ANNANDALE (1907) (material from India, N. Gist Gee 53439). m = megascleres and g = gemmoscleres of *R. amazonensis* n. sp. m' = megascleres and g' = gemmoscleres (young and adult) of *R. indica.*

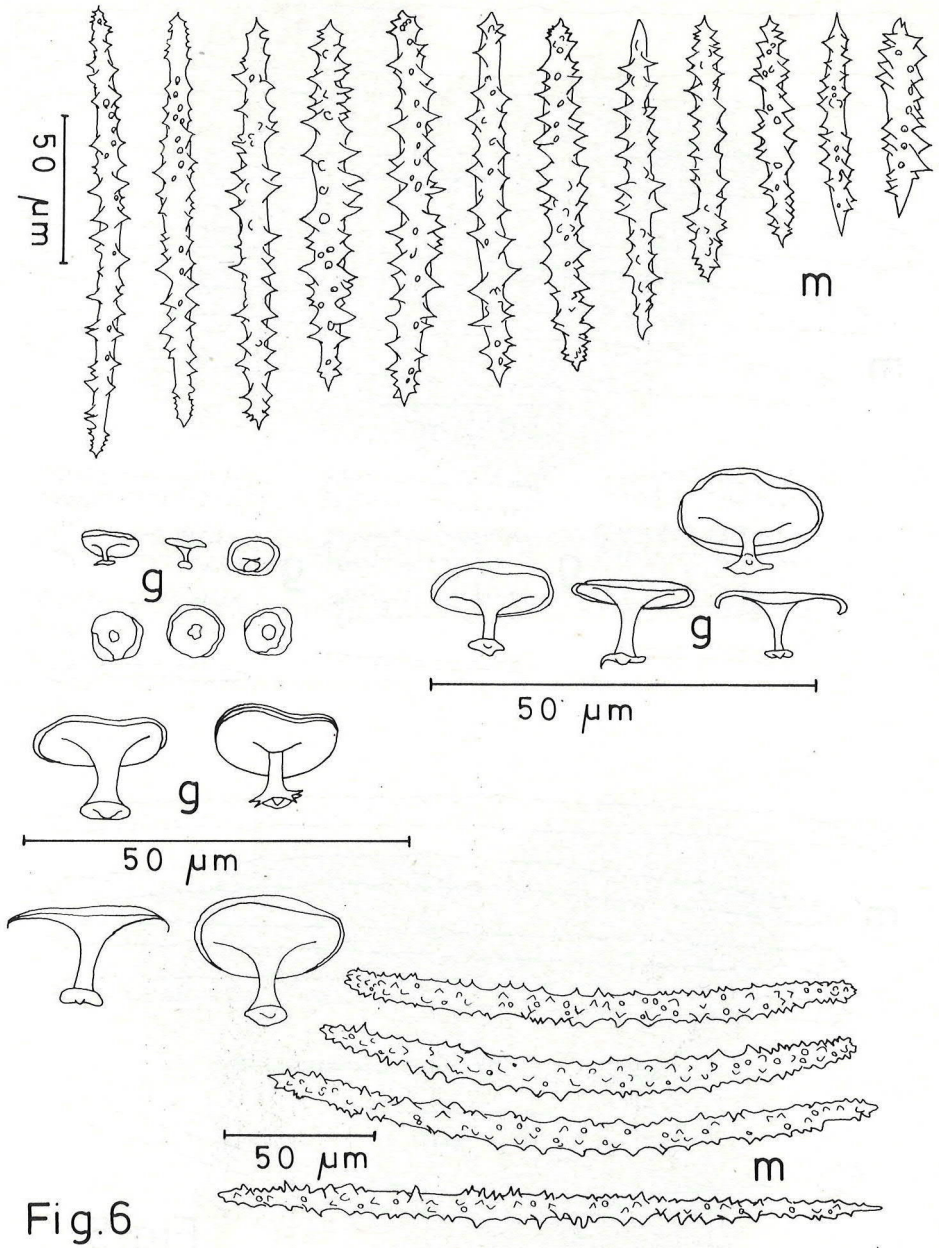

Fig.6

Fig. 6:
"Camera lucida" drawings of the spicular components of *Trochospongilla pennsylvanica* (POTTS 1882), material from Amazonian waters and material from the United States and Canada. m and g = respectively, megascleres and gemmoscleres of specimens from Amazonian waters. m' and g' = respectively, megascleres and gemmoscleres of specimens from the United States and Canada. At middle left gemmoscleres from amazonian material drawn at the same magnification as the megascleres.